

# THE SCIENCE NEWS-LETTER

*A Weekly Summary of Current Science*

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## ANCIENT EARTHQUAKES REVEAL ANCESTORS OF MAYA RACE

The forerunners of the wonderful Maya civilization in Central America have been discovered. Earthquakes which long ago shook Guatemala may enable archeologists to shove American pre-history back many thousands of years, and thus a new era ripe for archeological research will be revealed.

Such are the probable results of a three months reconnaissance survey of unknown Guatemala just completed by Dr. Manuel Gamio, leading Mexican archeologist, working under the auspices of the Archaeological Society of Washington. Dr. Gamio is now on his way to Washington, where he will study the material he has collected and will prepare a scientific report of his exploration trip.

The survey was for the purpose of determining whether Guatemala is a promising field for pre-Maya explorations. The first reports confirm the conjecture that the Guatemala highlands would yield evidence of ancient human occupancy, dating back to long before the time of Christ.

What happened in the central region of America before the rise of the Maya, the Toltecs, and the Aztecs is literally "pre-history". From time to time clay and stone fragments of great antiquity have been found in Central America, but archeologists have vaguely termed them as "Archaic" which means only that they belong to an age and a people that distinctly preceded the Maya.

In a report to the Washington Society, Dr. Gamio states that he has made several trial excavations, digging through seven strata of deposited soil, each layer being about 20 inches thick. In these deposits he found numerous fragments of pottery and clay sculptures. Many of these are of the Archaic type. There are a few Maya finds. Also, some of the pottery shows signs of a gradual transition to the ceramic style of the Maya, indicating that the two types may have blended or that one developed into the other.

Geography, and earthquakes in particular, are helping in this tracing of early Mayan history. Exploring this unsettled region, Dr. Gamio has found evidence that "the Maya, able constructors of lofty and complicated edifices, did not, if one may judge from appearances, build anything in the high zones affected by earthquakes. They confined themselves to the lower and above all to the coastal regions, where shocks were not experienced."

Buildings of the Maya remain standing in Guatemala today. Dr. Gamio suggests that probably these careful builders profited by the earthquake experiences of the

earlier and more primitive people, because the makers of the Archaic pottery had established their settlements with careless disregard of earthquake zones.

It is not yet determined, however, whether these early inhabitants built such simple homes that they did not fear the rocking of houses and the falling of walls, or whether there were fewer earthquakes in that part of the world then.

The part played by earthquakes in the wanderings of these prehistoric American tribes is being closely studied by Dr. Gamio, who says that earthquakes have had a marked influence on the development of human life.

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#### CRYSTALLINE INSULIN REQUIRES LONG STUDY

Insulin has been reduced to a purity so great that it comes down out of solution in the form of minute crystals, that shine like bits of uncut diamond when viewed through the microscope. Yet this result has not satisfied Dr. John J. Abel and his corps of co-workers at the school of medicine of the Johns Hopkins University. They expect to spend the coming two or three years, at least, investigating the properties of these crystals.

The insulin used in medicine is effective clinically, Dr. Abel told a representative of Science Service, but it has been recognized from the first that chemically it is far from being a pure product. Most chemical compounds indicate the attainment of a state of real purity by forming regular crystals, and nobody had been able to get crystals of insulin. The trouble was, Dr. Abel explained, that the insulin was all mixed up with a lot of other unknown substances that would precipitate at very nearly the same electro-chemical state of the solution.

Beginning with the ordinary insulin used in medicine, Dr. Abel and his associates passed it through an elaborate series of precipitations with various chemicals and repeated solutions in weak acetic acid. The crystals that come down at the last stage are very small. After settling out at the bottom of the flask they were picked up with a fine-pointed, rubber-tipped medicine dropper. The process of manufacture is so slow and difficult that months of work have resulted in the preparation of only a few hundred milligrams of the precious stuff.

This pure crystalline insulin is extremely potent, Dr. Abel states. One milligram of it, or a bit as large as a rather small grain of sand, has as much power to reduce blood sugar as is possessed by 100 clinical units of the solution used in medical practice. One fiftieth of a milligram will throw a  $4\frac{1}{2}$  pound rabbit into convulsions, which are quickly cured, however, by injecting a little sugar solution into the rabbit's veins.

Whenever a chemist succeeds in refining a natural compound to a purity that will result in crystal formation, the next step is usually expected to be the analysis of the crystals, with a view to the possible manufacture of the compound by artificial means, so that a perfectly uniform product may be obtained at a lower price. But Dr. Abel states that a year or more of work must intervene before the analysis can be completed. The synthesis of the compound will undoubtedly be a matter of

the greatest difficulty and may be impossible in the present state of our knowledge.

Dr. Abel is no novice in the field of purification of gland secretions. Three of the four extracts of the various ductless glands so far crystallized or brought to a very high concentration are checked up to his credit. In addition to the recent crystallization of insulin, he isolated epinephrin as a mono-benzoyl derivative from the extract of a ductless gland situated near the kidneys, and he has also prepared a highly purified and very potent tartrate, not yet crystallized, from extracts of the pituitary body. The fourth internal gland secretion to be purified is thyroxin, the extract of the thyroid gland of the throat region, which was crystallized by Dr. Edward Kendall of the Mayo Clinic.

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#### BLUE AND ORANGE AUTO LIGHTS TO ELIMINATE GLARE

Use of blue or orange headlights on automobiles, depending on which way the car is running, may soon be common on our roads, and will lessen the possibility of accidents due to glaring lights. This is one of the essential features of a system advocated by Karl D. Chambers, of Asheville, N.C. and demonstrated by him to the summer meeting of the Society of Automotive Engineers.

Common methods of eliminating glare now in use were declared by Mr. Chambers to be of little value. Even with special lenses, which are supposed to keep the light below the level of the wheels, an approaching motorist may receive the full glare of another machine if it is coming over the crest of a hill, if the back of the other machine is loaded unduly, or if the headlight is slightly out of adjustment, he declared.

Dimming was also stated to be of doubtful utility, for when the eye is used to the bright lights, and they are suddenly dimmed, it takes from three to five seconds for the eye to become accustomed to the faint illumination. While this readjustment of the sensitive lining of the eye is taking place, the car going thirty miles an hour will travel from 132 to 220 feet while the driver is practically blind.

In his new system, Mr. Chambers takes advantage of the fact that a colored glass filter transmits light through it of its own color, but stops that of a complementary color. Two filters, one blue and the other orange, are attached to the windshield, ordinarily swung up out of the way, but when the blue filter is in place, a similar blue filter is automatically placed over the headlight, while when the orange filter is in use, the headlights shine with orange light.

The inventor describes the operation of his system as follows:

"If a car is going north, let us say on the Dixie Highway, and is conventionally using blue headlights, the driver must be looking through a blue filter, quite transparent to the light of the wave lengths that his headlights are throwing on the path of his car. Consequently, he can see practically the same as though he were driving with white light with no approaching car causing glare.

"A car coming south now approaches. On account of the fact that it is southbound



it will be burning its orange headlights and the driver must be looking through his orange filter. Consequently, he can see the road as illuminated by his orange headlights perfectly. However, the orange light of the southbound car will not go through the blue viewing-filter of the northbound car, nor will the blue light of the northbound car go through the filter of the southbound car. The result is that both drivers have perfect visibility.

"When the driver of a car equipped with this system approaches another car similarly equipped on the road at night the headlights of the approaching automobile will appear to be lighted by an old-fashioned kerosene lamp with a very much smoked up lamp shade. In actual tests made, the number plate between two headlamps on two approaching cars could be read perfectly and the people sitting in the back seat were easily recognized."

In order that red danger lamps may be distinguished, Mr. Chambers uses viewing filters that transmit deep red light in addition to orange or blue. He also claims that the system lessens the disturbing effect of dust or dirt on the windshield.

#### UNIVERSE SAID TO BE RUNNING DOWN

The universe is running down. Presented as a purely scientific conclusion, such is the statement of Dr. Richard C. Tolman, noted physical chemist of the California Institute of Technology, in an address to the Sigma Xi scientific society at Pasadena. Dr. Tolman admits this conclusion is probably untenable for a philosopher, who would want to know "who wound the universe up"; or if nobody wound it up, how could it have been running down for an infinite period of past time and still operate?

Taking the position of a court of law rather than that of a speculator in thoughts, the physical chemist of today finds no direct evidence whatsoever to deny the apparent fact that matter is being dissipated into a chaos of worthless scattered energy. To be sure, only a few species of matter are being actively destroyed in this manner on earth, but the tremendous radiations of the sun and stars are explainable on no other basis.

Dr. Tolman points out that future research may prove the atoms of terrestrial matter to be amenable to some setting-off process roughly analogous to the touching of a match to gunpowder. Possibly some of the so-called "novae" or new stars, which burst suddenly into view with a brilliance born of terrific temperatures and enormous radiation, may have been set off by a cosmic fuse of some sort. Obviously the control of such forces on earth by man would involve fearful responsibilities.

It is not necessary, in the degradation of matter into scattered energy, that large atoms should always break down into small ones. It is known that hydrogen atoms - the smallest atoms known - of their own free will combine in quartets to form helium atoms, but release in the process nearly one per cent. of their substance. The off-shoot is transformed into an enormous quantity of energy. Recent calculations show that the new cosmic rays, investigated last summer by Millikan, may well have come from the hydrogen-helium transformation in some distant nebula or star. At least it is known that they do not come from the earth or necessarily from the sun.

The transmutation of hydrogen into helium is very slow in most parts of the universe, so that the accumulated supply of the valuable product is small. The control of the reaction would plainly serve as a tremendous impetus to the airship industry, but the key to the puzzle is not in sight.

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#### SUICIDES FEWER AMONG SAVAGES

Suicide, characteristic of modern western cities, is found also among all except the most simple of primitive peoples. But the suicide of primitive people differs in several ways from that of present-day America, according to a report to the American Anthropological Association by Miss Ruth Shonle, graduate student at the University of Chicago.

While primitive people commit suicide because of quarrels, love affairs, deaths and illness in the same manner that civilized people do, such suicides among primitive people are very rare. This personal type of suicide which occurs when individual wishes or needs are disturbed is found most frequently in modern cities where the individual is allowed to drift along by himself without much supervision by society. In the primitive village every need of life is recognized and regulated by the group; consequently there is little opportunity for an individual to become disorganized and unhappy. The stable customs and incorporation of the individual into the neighborhood in civilized rural and religious communities makes them similar to the primitive society, and they also have few suicides. In the United States the city suicide rate is more than 30 per cent. higher than the rate in rural districts while in some European countries two to three times as many suicides per unit of population occur in cities as in the rural communities.

A striking contrast to Europe and America is found in the institutional suicides among primitive people - suicide which occurs at the command of the tribe and with its assistance and usually with some ritual. Such suicides are those of the sick and aged in Eskimo and northern Asiatic tribes, and suicide as punishment in parts of Africa; they are most widespread in the Pacific Islands and Africa where it is customary for the widow to commit suicide with the assistance of her friends at her husband's funeral. This same kind of suicide was formerly found in the Orient, the suttee of Hindu widows being perhaps the most conspicuous example, but it is not found in Europe and America because the individualism of the last few centuries has released the individual from the strict social control which is necessary for such suicides, and also because in these countries Christianity has given to human life a value paramount to all other values.

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The air is so dry in Chile that lips and hands are chapped continually.

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Infections of the teeth and tonsils may effect eyesight seriously.

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### NEW MEGAPHONE SPREADS SOUND BROADCAST

A new megaphone which distributes sound over a greater area has just been developed by Prof. F. R. Watson of the University of Illinois, authority on acoustics. Already cheerleaders at the Universities of Illinois, Michigan, Wisconsin, and Minnesota have adopted the new instrument and indications are that its use will soon become widespread.

The megaphone is constructed of tin; it is only a foot and a half in length and strangest of all, has only a narrow rectangular opening. It is almost flat in appearance and is used in a horizontal position with the rectangular opening in a vertical plane.

Construction of the megaphone is based on the sound diffraction theory that sound passing through a narrow aperture spreads out. The ordinary megaphone differs from Prof. Watson's in that sound passing through it tends to travel only along the axes of the megaphone and not sideways. It permits only the people in front of the announcer to hear.

Sounds issued through the narrow opening of the new megaphone spread out in a wide area. The commonly used megaphone can be used only to direct sound audibly along one plane.

Prof. Watson conceived the idea of the invention more than 10 years ago when he began research in acoustics. He developed it this year upon the request of Illinois athletic officials who became concerned as to how cheering could be better conducted in the large Illinois Memorial Stadium and the Illinois Basketball Gymnasium.

Since the announcement of the invention, Prof. Watson has received many requests concerning information about its construction. He is interested in having the instrument adopted and will willingly answer any questions.

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### OXYGEN GAS STERILIZES AND PRESERVES FRUIT JUICES

Oxygen, under ordinary conditions the very essence of the breath of life, is to be used as a means of killing germs and similar organisms and thus bring about the sterilization and preservation of fruit juices without injuring their delicate flavors, by a process which has been perfected recently by Dr. L. R. Cleveland of the Harvard University Medical School.

Dr. Cleveland states that by the use under pressure of the ordinary commercial oxygen gas, sold in cylinders for welding and other industrial purposes, he can kill all germs and other micro-organisms in periods of from twelve hours to four or five days, depending on the nature and quantity of juice under treatment and the amount of pressure used. In bulk, the juices can be enclosed in strong steel drums or barrels, the oxygen run into them up to the proper pressure, and the whole stored away indefinitely. In smaller quantities, as in bottles or cans, the containers can be placed in a pressure tank, and then sealed or capped under sterile conditions in an atmosphere of pure oxygen.



While the process is fatal to all microbes if continued long enough, Dr. Cleveland has found that the pathogenes, or disease-causing germs, are the easiest to destroy. High pressures or long exposure periods kill the germs completely, while less drastic treatment will leave them alive but unable to multiply; that is, it will preserve the material without absolutely sterilizing it.

Dr. Cleveland did not discover this process suddenly; it came as the result of a long series of experiments. The first inkling of the principle underlying this new method of preserving fruit juices was discovered while he was studying the minute, one-celled animals or protozoa that live in the digestive tracts of termites or white ants. He wanted to get the insects free of their tiny guests, and tried various methods, including heat treatment, with success. He found finally that if he increased the oxygen present in the atmosphere of the jars in which they were kept, the insects would live while the protozoa inside them died. The difference in the effect of oxygen on the microorganisms in white ants and on the white ants themselves was very great; the ants survived more than forty times, the amount of oxygen required to kill their intestinal guests.

Following this, Dr. Cleveland ~~very soon~~ discovered that many other animals, including even the cold-blooded vertebrates among the higher animals, lost their protozoa when confined in oxygen. Applications of this principle may be made in combating the diseases of economic insects such as silkworms and bees, in freeing young fish of disease-causing parasites, and in testing out the ability of insects to transmit protozoa and spirochaetes to man, animals, and plants.

Turning from the study of the killing effect of oxygen on parasitic microorganisms, Dr. Cleveland found that it was possible to kill such organisms as bacteria, molds, and yeasts living free in nature by confining them in oxygen under pressure. This suggested the query: "Is it possible without rendering food unwholesome to kill the microorganisms which cause it to spoil?" The work on fruit juices is an answer to this question.

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#### NOISELESS GAS CAR FOR SWEDISH RAILWAYS

A "silent" railway motor car without engine vibrations has been achieved, and during its recent trial run over the Swedish State Railways from Malmö to Stockholm the passengers heard no other noise than that of the wheels clicking against the rail joints. It is the design of a Swedish engineer, Magnus Tacklind, of Stockholm, but has been manufactured in Germany. Except for certain motor parts it will later be built in Sweden.

The absence of the noise and vibration is due to the fact that the motor is not placed on the same frame as the passenger car itself, but is entirely isolated from it, being slung underneath. The power is transferred to the driving axle from the motor through five different sets of gears, which are kept going all the time, so as to make the driving smoother. The speed attained reached over 50 miles per hour while the consumption of fuel, a mixture of benzine and benzol, averaged about eight miles to the gallon, or about twice that of an ordinary taxicab. Its seating capacity is sixty persons, but a trailer with the same number may be coupled behind. It

is a "one man" car and is operated from the driver's seat through electrical connections.

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#### NEW KIND OF LIGHT SUPPLIED BY CHEMISTRY

"Chemiluminescence" is the term applied to a new kind of light caused by chemical reactions which involve no burning or combustion. The practical application of this principle has been worked out in a factory in Hungary where a tube has been devised in which chemiluminescent reactions can be carried out in a vacuum.

The materials which have thus far proved most successful in this capacity are chlorine gas and sodium vapor. These two elements brought together in this form combine to produce sodium chloride, or common table salt, giving off in the process a brilliant yellow light. About one-tenth of the energy involved in this reaction is converted into light.

It is expected that such tubes will find practical use for special scientific experiments and among surgeons, due to the fact that the light they give off is of only one color and not composed like ordinary daylight of all the colors of the spectrum.

An idea following somewhat similar lines has been devised in this country for making luminous compounds. According to a patent recently granted, the phenomenon of phosphorescence can be produced by the reactions of two classes of substances known as "luminophores" and "phosphorogens" with a base of some mineral carbonate and a combustible material like starch or sulfur. Luminophores are compounds of the lighter metals such as sodium and potassium, while the phosphorogens are compounds of heavier metals like silver, nickel, and the radioactive uranium and thorium. These latter make the limestone base phosphoresce and the former impart the desired color to the glow.

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#### DANISH SCIENTIST STUDIES EELS OF PACIFIC

The man who found out where the eels of Europe and America go when they disappear in the fall has set out to solve a similar problem in the Pacific Ocean.

That the breeding ground of the common fresh water eels of both countries overlap in a section of the Atlantic south of the Bermuda Islands, a location thousands of miles from their summer homes, was ascertained largely through the researches of Dr. Johannes Schmidt of the Carlsberg Laboratories of Copenhagen. For the last twenty years he has been studying young eels picked up in nets from points all over the Atlantic, working much of the time under very primitive conditions. The young eel larvae of both the American and European eels are hatched in the mysterious Sargasso sea. How these elvers know which continent to make for when seized by the migratory urge to reach fresh water is a question the scientists refrain from answering but according to Dr. Schmidt there is no record of their ever having made a mistake.



Having settled the question of the common fresh water eels which breed in the Atlantic, he has now turned his attention to those found in the Pacific and Indian Oceans about which there is very little scientific information available. He has just spent two months in Tahiti where he has collected a large mass of material and data that will be worked up and studied on his return to Copenhagen and from which it is hoped valuable information of the life history of the Pacific eels will be obtained.

During his stop in Washington Dr. Schmidt was made an honorary member of the Washington Academy of Sciences.

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#### OIL OF WINTERGREEN FOUND POISONOUS INTERNALLY

Oil of wintergreen, commonly used in salves and liniments, is extremely poisonous when taken internally even in moderate doses. Drs. N. C. Wetzel and J. D. Nourse report that quantities of less than two fluid ounces have resulted in death.

The toxic effects of this familiar drug, in frequent use in medical practice to allay pain and reduce fever, seem not to have been generally recognized. They are ascribed to the fact that oil of wintergreen, after being taken into the body, undergoes very little chemical destruction, or breaking up into less dangerous components.

Editorial comment in the Journal of the American Medical Association says that from the standpoint of public welfare, "Access to oil of wintergreen should be made impossible for children and for persons ignorant of its poisonous properties."

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#### MACHINE CLEANS APPLES BY SLAPPING

Wiping machines are the latest wrinkle to be added to the mechanism of fruit packing. The Apple Growers' Union of Washington is one of the first to install this apparatus which is designed to remove spray residue from apples packed during the season of 1926.

The fruit will pass over horizontal revolving rollers and is slapped clean by 500 pieces of canvas. The machine is electrically driven and provided with a fan to remove dirt and dust.

This invention is doubtless designed to counteract the impression that seems in some regions to have gained considerable ground that poisoning has resulted from the arsenic residue left on apples during spraying.

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Czechoslovakia is one of the world's chief producers of plate glass.

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## TABLOID BOOK REVIEW

READINGS IN SCIENCE. Edited by John A. Lester. Boston: Houghton Mifflin Co.

This new number of the famous Riverside Literature Series is devoted to literature of an uncommon sort, namely, brief articles on various scientific topics by Sir Oliver Lodge, John Tyndall, H.G. Wells, William Beebe, J. Arthur Thomson, Benjamin Harrow, Edwin E. Slosson, Vernon Kellogg, etc. The editor defends his innovation by saying:

"Even a professional instructor of English may be forgiven for a dawning doubt whether the exploration of the successive steps by which Macbeth degenerates into an angry brute, however adroitly and lucidly it may be pursued, is really, as a detail of an adolescent boy's education, comparable in importance with frank and simple discussion of the means of assuaging the passions of men in the interest of the future of civilization."

PRACTICAL RADIO: By James A. Moyer and John F. Wostrel. New York, McGraw-Hill Book Company, 1926. 271 pp., \$1.75.

To the radio fan who uses a set which he has purchased complete, but who wishes to learn some of the practical details of its operation and ways of testing it, this book is one to be heartily recommended. Though it is intended as a text book for use in practical electricity courses, this fact makes it none the less attractive. And then, if the reader's interest is aroused to such a point that he wishes to construct some of his own pieces of apparatus, he will also find, in the last chapters, some useful instructions on this phase of the radio art.

THE NEW NATURAL HISTORY. (First volume) By J. Arthur Thomson. New York: G. P. Putnam's Sons. 1926.

Prof. Thomson makes his foreword a sort of apologia for writing another book on natural history, when so many are already in existence. As if any one wanted an accounting for Thomson's books! Our only concern is that he will not have time, even in a long lifetime, to write as many of his kind of books as the world should have. The "slant" of the New Natural History is in the direction of what the learned call Ecology, which means the Housekeeping of Nature - not so much a discussion of living things one by one as a snipping here and there of vivid bits from the intimately interwoven web of life, with birds and worms and trees and flowers and grass all mixed up together, as one actually finds them outdoors. There are a lot of very good photographs, and a considerable number of really sumptuous colored plates.

THE COMMON SENSE OF THE THEORY OF RELATIVITY; by Paul R. Heyl. Baltimore, Williams and Wilkins Company, 1924. 44pp.

In this small but meaty book, which is a reprint of an article which appeared originally in the Scientific Monthly, Dr. Heyl shows that the so-called "ridiculous" aspects of relativity can be reconciled with common sense. However, while he regards the Einstein theory as a distinct improvement on Newton, in that it explains phenomena for which the older views fell short, he protests against regarding relativity as final. "Newton cut so closely," Dr. Heyl concludes, "that over two centuries elapsed before an Einstein could better his formula; and how long it will be before the next corrective term is added to the empirical equation for the great curve of Nature is a matter at present on the knees of the gods."